MARINE ECOLOGY
PROGRESS SERIES

Volume 82 (1992)

Editor
Otto Kinne

Assistant Editor: John Austin
Editorial Assistants: Catherine Fesefeldt, John Hunt, Rosemarie Stedjee

Ecology Institute, Nordbünte 23, W-2124 Oldendorf/Luhe, Germany
Tel (+49) (0)4132 7127, Fax (+49) (0)4132 8883

Inter-Research
1992

Editorial Advisors

Editorial Advisors to Marine Ecology Progress Series are appointed for a four-year period. They are expected to:

- ○ critically evaluate the scientific merits of manuscripts submitted for publication
- ○ suggest topics and authors for reviews
- ○ select and present suitable high-quality manuscripts
- ○ draw attention to new facts, concepts and methods

In addition to the Editorial Advisors listed below, about 300 referees cooperate anonymously.

ENVIRONMENTAL FACTORS

Alderdice, D., Dr
Pacific Biological Station, Nanaimo, B.C., Canada V9R 5K6
Responses to environmental factors

Collos, Y., Dr
Centre de Recherche en Ecologie Marine et Aquaculture, B.P.5, L'Houmeau, France
Nitrogen metabolism of phytoplankton

Dring, M. J., Dr
Botany Dept, The Queen's Univ. of Belfast, Belfast BT7 1NN, Northern Ireland
Physiological ecology of algae

Fisher, N. S., Dr
Marine Sciences Research Center, State Univ. of New York, Stony Brook, NY 11794-5000, USA
Physiological ecology of phytoplankton

Fowler, S. W., Dr
IAEA, ILMR, Stade Louis II, Entrée C-19, Ave des Castellans, MC-98000 Monaco
Environmental effects on invertebrates

Haedrich, R. L., Prof.
Memorial University of Newfoundland, St. John's, Nfld., Canada A1B 3X9
Environmental effects on fishes (incl. deep sea)

Kasyanov, V., Dr
Institute of Marine Biology, Academy of Sciences, Vladivostok 690032, USSR
Environmental effects on invertebrates; reproduction, development

Kiørboe, T., Dr
Danish Institute for Fisheries and Marine Res., Charlottenlund Castle, DK-2920 Charlottenlund, Denmark
Physiological ecology of zooplankton, including fishes (esp. larvae)

Lawrence, J. M., Prof.
Dept of Biology, Univ. of South Florida, Tampa, FL 33620, USA
Physiological ecology of invertebrates

Luoma, S. N., Dr
US Dept of the Interior, Geological Survey, Water Resources Div., 345 Middlefield Rd, Menlo Park, CA 94025, USA
Geochemical and biological factors affecting biochemical processes in invertebrates; contaminant effects on bioavailability

McLusky, D. S., Dr
Dept of Biological Sciences, Univ. Stirling, Stirling FK9 4LA, Scotland
Physiological ecology of invertebrates

Meyer-Reil, L.-A., Dr
Institut für Meereskunde, Düsternbrooker Weg 20, W-2300 Kiel, Germany
Environmental effects on benthic microorganisms, benthic microbial ecology

Meyers, S. P., Prof.
Dept of Food Science, Louisiana State Univ., Baton Rouge, LA 70803, USA
Physiological ecology of microorganisms

Morita, R. Y., Prof.
Dept of Microbiology, Oregon State Univ., Corvallis, OR 97331, USA
Marine microbiology

Paasche, E., Prof.
Dept of Biology, Univ. Oslo, Marine Botany, PO Box 1069, Blindern, N-0316 Oslo 3, Norway
Physiological ecology of phytoplankton; primary production; benthic algae

Rheinheimer, G., Prof.
Institut für Meereskunde, Univ. Kiel, Düsternbrooker Weg 20, W-2300 Kiel, Germany
Marine microbiology

Riisgård, H. U., Dr
Odense Universitet, Biologisk Institut, Campusvej 55, DK-5230 Odense M., Denmark
Environmental effects on invertebrates; bioenergetics of suspension feeders

Sammarco, P. W., Dr
Louisiana Universities Marine Consortium, Chauvin, LA 70344, USA
Experimental ecology; chemical ecology

Southward, A. J., Dr
Plymouth Marine Laboratory, Citadel Hill, Plymouth PL1 2PB, England
Environmental effects on invertebrates

Vernberg, J., Prof.
Belle W. Baruch Institute for Marine Biol. and Coastal Res., Univ. of South Carolina, Columbia, SC 29208, USA
Physiological ecology of invertebrates

West, J. A., Prof.
Dept of Plant Biology, Univ. of California, 111 Genetics Plant Biology Bldg, Berkeley, CA 94720, USA
Physiological ecology and reproductive biology of estuarine and marine benthic macroalgae

Westernhagen, H. von, Dr
Biologische Anstalt Helgoland, Notkestr. 31, W-2000 Hamburg 52, Germany
Effects of pollution on marine communities

Winter, J. E., Dr
Instituto de Zoología, Univ. Austral de Chile, Casilla 567, Valdivia, Chile
Physiological ecology of invertebrates

PHYSIOLOGICAL MECHANISMS

Alderdice, D., Dr
Pacific Biological Station, Nanaimo, B. C., Canada V9R 5KR
Resistance to stress including pollution; regulation; adaptation

Batty, R. S., Dr
Dunstaffnage Marine Research Laboratory, PO Box 3, Oban, Argyll PA34 3AD, Scotland
Behavioral physiology of fish; feeding; predation of fish larvae

Brown, B. E., Dr
Dept of Biology, The University, Newcastle upon Tyne NE1 7RU, England
Physiology and ecology of corals

Burton, R. S., Prof.
Univ. of Houston, Dept of Biology, Houston, Texas 77204-5513, USA
Population genetics; evolutionary mechanisms in populations; biochemical and molecular genetic analyses of invertebrates

Caron, D. A., Dr
Biology Dept, Woods Hole Oceanographic Institution, Woods Hole, MA 02543, USA
Feeding, respiration and nutrient regeneration of protozoans

Chapman, A. R. O., Prof.
Institut für Meereskunde an der Universität Kiel, Düsternbrooker Weg 20, W-2300 Kiel 1, Germany
Physiology and demography of macroalgae

Conover, R. J., Dr
Marine Ecology Laboratory, Bedford Institute of Oceanography, PO Box 1006, Dartmouth, N.S., Canada B2Y 4A2
Physiology and biochemistry of zooplankton

Costlow, J. D., Jr, Prof.
Duke University Marine Laboratory, Pivers Island, Beaufort, NC 28516, USA
Developmental physiology; endocrinology

Enright, J. T., Prof.
Scripps Institution of Oceanography, San Diego, PO Box 1529, La Jolla, CA 92093, USA
Biological rhythms

Forward, R. B., Jr, Dr
Duke University Marine Laboratory Pivers Island, Beaufort, NC 28516–9721, USA
Environmental zoo-physiology; behavior; biological rhythms

Fowler, S. W., Dr
IAEA, ILMR, Stade Louis II, Entrée C-19, Ave des Castellans, MC-98000 Monaco
Trace element metabolism

Gerking, S. D., Prof.
Dept of Zoology, Arizona State Univ.,Tempe, AZ 85281, USA
Fish physiology

Holland, N. D., Prof.
Scripps Institution of Oceanography, San Diego, PO Box 1529, La Jolla, CA 92093, USA
Comparative, cellular and developmental physiology

Humphrey, G. F., Dr
CSIRO Marine Biochemistry, Building A12, Sydney Univ., N.S.W. 2006, Australia
Photosynthesis; plankton biochemistry

Levandowsky, M., Dr
Haskins Laboratories at Pace Univ., 41 Park Row, New York, NY 10038, USA
Chemosensory behavior; mathematical models

Marinescu, A.-G., Dr
Institute of Biological Sciences, 77748 Bucharest, Str. Splaiul-Independentei 296, Romania
Stress effects on invertebrates

McLusky, D. S., Dr
Dept of Biological Sciences, Univ. Stirling, Stirling FK9 4LA, Scotland
Osmoregulation in estuarine invertebrates

Naylor, E., Prof.
School of Ocean Sciences, Univ. of Wales, Menai Bridge, Gwynedd LL59 5EY, Wales, UK
Behavioural physiology; invertebrate biology

Puiseux-Dao, S., Prof.
Laboratoire de Cytophysiologia végétale et de Toxicologie cellulaire, Université de Paris VII, 2, Place Jussieu, F-75251 Paris Cedex 05, France
Ecophysiology and toxicology of algae; cellular biology; behavior of algae

Shick, J. M., Prof.
Dept. of Zoology, Univ. of Maine, Murray Hall, Orono, Maine 04469-0146, USA
Physiological energetics of invertebrates, incl. metabolic calorimetry; symbioses; hyperoxia and oxidative stress; effects of UV light; sea anemone biology

Videler, J. J., Dr
Dept of Marine Biology, Univ. of Groningen, PO Box 14, 9750 AA Haren, The Netherlands
Swimming dynamics of plankton; activity pattern and reproductive strategies of fishes; energy budgets of herbivores

West, J. A., Prof.
Dept of Plant Biology, Univ. of California, 111 Genetics Plant Biology Bldg, Berkeley, CA 94720, USA
Chemistry of red algae; molecular genetics of red and green algae

Zhirmunsky, A. V., Prof.
Institute of Marine Biology, Academy of Sciences, Vladivostok 690032, Russia
Mechanisms of cellular resistance and control

CULTIVATION

Lawrence, J. M., Prof.
Dept of Biology, Univ. of South Florida, Tampa, FL 33620, USA
Nutrition of invertebrates

Levandowsky, M., Dr
Haskins Laboratories at Pace Univ., 41 Park Row, New York, NY 10038, USA
Microcosm cultures

Meyers, S. P., Prof.
Dept of Food Science, Louisiana State Univ., Baton Rouge, LA 70803, USA
Cultivation of microorganisms and crustaceans; aquaculture; microenvironments

Pandian, T. J., Prof.
School of Biological Sciences, Madurai Kamaraj Univ., Madurai 625 021, Tamilnadu, India
Cultivation of decapods and fishes; bioenergetics

Rheinheimer, G., Prof.
Institut für Meereskunde, Univ. Kiel, Düsternbrooker Weg 20, W-2300 Kiel, Germany
Cultivation of microorganisms

Winter, J. E., Dr
Instituto de Zoología, Univ. Austral de Chile, Casilla 567, Valdivia, Chile
Cultivation of invertebrates

DYNAMICS

Arndt, E. A., Prof.
Wilhelm-Pieck-Universität Rostock, Sektion Biologie, Freiligrathstr. 7/8, O-2500 Rostock, Germany
Ecological dynamics of brackish waters

Azam, F., Prof.
Scripps Institution of Oceanography, Univ. of California, La Jolla, CA 92093, USA
Viral and bacterial ecology; microbial biogeochemistry

Bak, R. P. M., Dr
Nederlands Instituut voor Onderzoek der Zee, Postbox 59, 1790 AB Den Burg – Texel, The Netherlands
Coral-reef ecology

Banse, K., Prof.
School of Oceanography, WB-10, Univ. of Washington, Seattle, WA 98195, USA
Biological oceanography; plankton research

Berman, T., Prof.
Kinneret Limnological Laboratory, PO Box 345, Tiberias 14102, Israel
Phytoplankton ecology

Bianchi, A., Dr
C.N.R.S. ER 223, Microbiologie Marine, Campus de Luminy – case 907, 70, route Léon Lachamp, F-13288 Marseille Cedex 9, France
Marine microbiology; ecological dynamics

Birkeland, C., Prof.
Univ. of Guam, Marine Laboratory, UOG Station, Mangilao, Guam 96913
Coral-reef ecology; benthic ecology

Brattegard, T., Dr
Universitetet i Bergen, Institutt for fiskeri-og marin-biologi, Thormohlens gt. 55, N-5008 Bergen, Norway
Ecology of suprabenthic animals; distribution of crustaceans

Bunt, J. S., Dr
4/6 McDonald Street, Potts Point, NSW 2011, Australia
Mangrove systems; reef studies

Caron, D. A., Dr
Biology Dept, Woods Hole Oceanographic Institution, Woods Hole, MA 02543, USA
Microbial ecology; trophic relations between planktonic protozoans and other heterotrophic and photosynthetic organisms; pelagic detrital aggregates

Chapman, A. R. O., Prof.
Institut für Meereskunde an der Universität Kiel, Düsternbrooker Weg 20, W-2300 Kiel 1, Germany
Community ecology of rocky shores

Collos, Y., Dr
Centre de Recherche en Ecologie Marine et Aquaculture, B.P.5, L'Houmeau, France
Nitrogen cycling and primary production

Conover, R. J., Dr
Marine Ecology Laboratory, Bedford Institute of Oceanography, PO Box 1006, Dartmouth, N.S., Canada B2Y 4A2
Zooplankton biology

Cushing, D. H., Dr
Ministry of Agriculture, Fisheries and Food, Fisheries Laboratory, Lowestoft, Suffolk NR33 OHT, England
Productivity of the sea; fish-population dynamics; biological oceanography

Elliott, M., Dr
Dept of Applied Biology, Institute of Estuarine and Coastal Studies, The University, Hull HU6 7RX, UK
Structure and function of fish and benthic communities

Fenchel, T., Prof.
Marine Biological Laboratory (University of Copenhagen), DK-3000 Helsingør, Denmark
Population biology; microbial ecology

Field, J. G., Prof.
University of Cape Town, Zool. Dept, Rondebosch 7700, Republic of South Africa
Dynamics of nearshore ecosystems

Foster, M. S., Prof.
Moss Landing Marine Laboratories, California State Univ., PO Box 450, Moss Landing, CA 95039-040, USA
Population and community ecology of macroalgae

Fowler, S. W., Dr
IAEA, ILMR, Stade Louis II, Entrée C-19, Ave des Castellans, MC-98000 Monaco
Particle flux; biogeochemistry

Fuhrman, J., Prof.
Marine Biology Res. Section, Dept of Biological Sciences, Univ. of Southern California, Los Angeles, CA 90089-0371, USA
Planktonic microbial ecology. Productivity and growth of microorganisms, especially bacteria

Furness, R. W., Dr
Department of Zoology, The University of Glasgow, Glasgow G12 8QQ, Scotland
Ecology of sea birds

Furuya, K., Dr
Faculty of Bioresources, Mie University, 1515 Kamihama, Tsu 514, Japan
Phytoplankton ecology; community structure, dynamics

Gage, J. D., Dr
Dunstaffnage Marine Research Laboratory, PO Box 3, Oban, Argyll PA34 4AD, Scotland
Benthos of deep sea and temperate coasts

Gray, J., Prof.
Institutt for Marinbiologi og Limnologi, Univ. Oslo, Postboks 1064, Blindern, Oslo 3, Norway
Soft-sediment ecology

Haedrich, R. L., Prof.
Memorial University of Newfoundland, St. John's, Nfld., Canada A1B 3X9
Zoogeography; natural history of fish

Harding, G. C., Dr
Marine Ecology Laboratory, Bedford Institute of Oceanography, PO Box 1006, Dartmouth, N.S., Canada B2Y 4A2
Crustacean ecology (incl. deep sea)

Heck, K. L., Jr, Dr
Marine Environmental Sciences Consortium, Dauphin Island Sea Lab., PO Box 369-370, Dauphin Island, AL 36528, USA
Benthic ecology, emphasis on seagrass ecosystems

Holm-Hansen, O., Dr
Scripps Inst. of Oceanography, Univ. of California, La Jolla, CA 92093, USA
Polar ecology; chemical oceanography; photosynthesis

Hudon, C., Dr
Halifax Research Laboratory, C.P. 550, Halifax, Nova Scotia, Canada B3J 2S7
Crustacean ecology and biology

Hughes, R. N., Dr
School of Animal Biology, Univ. College North Wales, Bangor, Gwynedd LL57 2UW, Wales, UK
Ecological energetics (particularly feeding)

Karlson, R. H., Prof.
School of Life and Health Sciences Ecology Program, Univ. of Delaware, Newark, Delaware 19716, USA
Population and community ecology of benthic invertebrates

Kiørboe, T., Dr
Danish Institute for Fisheries and Marine Res., Charlottenlund Castle, DK-2910 Charlottenlund, Denmark
Biological oceanography; physical and biological processes in the pelagial with emphasis on copepods and fish larvae

Klumpp, D., Dr
Australian Institute of Marine Science, PMB No. 3, Townsville M. C., Q. 4810, Australia
Trophodynamics; animal nutrition, energy and nutrient budgets; nutrient cycling; primary productivity; fish biology; seagrass, coral reef, kelp bed ecosystems

Kühlmann, D., Dr
Museum für Naturkunde der Humboldt-Univ., Invalidenstr. 43, O-104 Berlin, Germany
Coral-reef ecology; coral evolution

Landry, M. R., Dr
Dept of Oceanography, Univ. of Hawaii, Manoa, 1000 Pope Rd, Honolulu, HI 96822, USA
Food web interactions; zooplankton ecology

Lawrence, J. M., Prof.
Dept of Biology, Univ. of South Florida, Tampa, FL 33620, USA
Reproduction of invertebrates; nutrition

Levandowsky, M., Dr
Haskins Laboratories at Pace Univ., 41 Park Row, New York, NY 10038, USA
Ecological modelling; phytoplankton ecology

Levings, C., Dr
West Vancouver Laboratory, 4160 Marine Drive, West Vancouver, B.C., Canada V7V 1N6
Estuarine ecology of macrobenthos and fish

Lewis, J. B., Dr
Dept of Biology, McGill Univ., Stewart Biology Bldg, 1205 Dr. Penfield, Montreal, Quebec, Canada H3A 1B1
Coral-reef ecology; tropical marine biology

Lewis, M. R., Dr
Dept of Oceanography, Dalhousie University, Halifax, N.S., Canada B3H 4J1
Biological oceanography; phytoplankton physiology; modelling of physical and biological processes

Luoma, S. N., Dr
US Dept of the Interior, Geological Survey, Water Resources Div., 345 Middlefield Rd, Menlo Park, CA 94025, USA
Feeding ecology of deposit feeders; geochemistry of trace elements in sediments

Mauchline, J., Dr
Scottish Marine Biological Ass., Dunstaffnage Marine Res. Lab., POB 3, Oban, Argyll PA34 4AD, Scotland
Deep-sea ecology; radioactive pollution

Nelson, D. M., Prof.
College of Oceanography, Oregon State Univ., Oceanography Admin. Bldg. 104, Corvallis, OR 97331, USA
Phytoplankton ecology; nutrient cycling

Neushul, M., Prof.
Dept of Biological Sciences, Univ. of California, Santa Barbara, CA 93106, USA
Ecology of benthos algae; marine macrophytes

Newell, S. Y., Dr
The University of Georgia, Marine Institute, Sapelo Island, GA 31327, USA
Ecology of fungi and bacteria; decomposition

Nybakken, J., Prof.
Moss Landing Marine Laboratories, California State Univ., PO Box 450, Moss Landing, CA 95039-0450, USA
Ecology of molluscs; community structure of soft-sediment invertebrates

Pearse, J. S., Prof.
Center for Coastal Marine Studies, Univ. of California, Santa Cruz, CA 95064, USA
Kelp forest ecology; reproductive ecology

Peterson, C. H., Prof.
Institute of Marine Science, Univ. of N. Carolina at Chapel Hill, 3407 Arendell Street, Morehead City, NC 28557, USA
Marine benthic ecology; population biology

Pichon, M., Prof.
Australian Institute of Marine Science, PMB No. 3, Townsville M.C., Q. 4810, Australia
Coral-reef ecology; shallow-water tropical communities

Platt, T., Dr
Marine Ecology Laboratory, Bedford Institute of Oceanography, PO Box 1006, Dartmouth, N.S., Canada B2Y 4A2
Phytoplankton ecology; primary production

Purcell, J. E., Dr
The University of Maryland Systems, Center for Environmental and Estuarine Studies, PO Box 775, Cambridge, MD 21613, USA
Zooplankton ecology and behavior; trophic dynamics; prey selection. Competition for space among benthic invertebrates

Reise, K., Dr
Biologische Anstalt Helgoland, W-2282 List/Sylt, Germany
Benthos ecology

Sammarco, P. W., Dr
Louisiana Universities Marine Consortium, Chauvin, LA 70344, USA
Coral-reef ecology; benthic community ecology; ecology of fishes, echinoderms, coelenterates

Savidge, G., Dr
The Queen's Univ. of Belfast, Marine Biology Station, The Strand, Portaferry, Co. Down, Northern Ireland
Phytoplankton ecology; primary production; photosynthesis

Scheltema, R. S., Dr
Woods Hole Oceanographic Institution, Woods Hole, MA 02543, USA
Invertebrate larval ecology

Schneider, D. C., Dr
Newfoundland Institute for Cold Ocean Science, Memorial University of Newfoundland, St. John's, Newfoundland, Canada A1B 3X7
Dynamics of large organisms; ecology of sea birds

Sherr, B. & E., Drs
College of Oceanography, Oregon State Univ., Oceanogr. Admin Bldg 104, Corvallis, Oregon 97331, USA
Microbial food webs; trophic roles of phagotrophic protozoans

Skjoldal, H. R., Dr
Institute of Marine Research, Postboks 1870, N-5024 Bergen-Nordnes, Norway
Food webs and trophic interactions

Southward, A. J., Dr
Plymouth Marine Laboratory, Citadel Hill, Plymouth PL1 2PB, England
Rocky-coast ecosystems; deep-sea ecosystems

Stoecker, D. K., Dr
Horn Point Environmental Laboratories, PO Box 775, Cambridge, MD 21613, USA
Microzooplankton, particularly ciliates; secondary production

Tenore, K. R., Prof.
Chesapeake Biological Laboratory, PO Box 38, Solomons, MD 20688-0038, USA
Benthic ecology and bioenergetics; production; food chains of detritus-based systems

Thayer, G. W., Dr
Ecosystem Structure Branch, Southeast Fisheries Center, Beaufort, NC 28516-9722, USA
Wetlands ecology, incl. submerged seagrasses and emergent marshes; production and utilization of detritus

Underwood, A. J., Dr
School of Biol. Sci., Univ. Sydney, Zoology Building, Sydney, N.S.W. 2006, Australia
Experimental intertidal and subtidal ecology; behavior; life cycles of sessile invertebrates

Vinogradov, M. E., Prof.
P. P. Shirshov Institute of Oceanology, Academy of Sciences of USSR, 1, Letnaya (Ljublino), Moscow 109387, Russia
Oceanic plankton ecosystems; deep-sea amphipods; biological oceanography

Wangersky, P. J., Prof.
Dept of Oceanography, Dalhousie Univ., Halifax, N.S., Canada B3H 4J1
Organic matter in sea water; theoretical population dynamics; geochemistry; chemical oceanography

Warwick, R. M., Dr
Plymouth Marine Laboratory, Prospect Place, West Hoe, Plymouth PL1 3DH, England
Structure and functioning of benthic communities; meiofaunal ecology; energy flow

West, J. A., Prof.
Dept of Plant Biology, Univ. of California, 111 Genetics Plant Biology Bldg, Berkeley, CA 94720, USA
Reproductive dynamics of red algae; fine structure and parasites of algae

Williams, R., Dr
Plymouth Marine Laboratory, Prospect Place, West Hoe, Plymouth PL1 3DH, England
Plankton ecology; community structure, population dynamics

OCEAN MANAGEMENT

Alderdice, D., Dr
Pacific Biological Station, Nanaimo, B.C., Canada V9R 5KR
Pollution of marine environments

Bernhard, M., Dr
ENEA, PO Box 316, I-19100 La Spezia, Italy
Radioactive and conventional pollution

Brown, B. E., Dr
Dept of Biology, The University, Newcastle upon Tyne NE1 7RU, England
Effects of man-made and natural disturbances on coral reefs

Bryan, G. W., Dr
Plymouth Marine Laboratory, Citadel Hill, Plymouth PL1 2PB, England
Heavy metal pollution; estuarine chemistry

Eisler, R., Dr
U.S. Dept of the Interior, Fish and Wildlife Service, Laurel, MD 20708, USA
Toxicology and pollution

Elliott, M., Dr
Dept of Applied Biology, Institute of Estuarine and Coastal Studies, The University, Hull HU6 7RX, UK
Marine pollution assessment and control

Fisher, N. S., Dr
Marine Sciences Research Center, State Univ. of New York, Stony Brook, NY 11794-5000, USA
Pollutant effects on plankton; radioecology

Fowler, S. W., Dr
IAEA, ILMR, Stade Louis II, Entrée C-19, Ave des Castellans, MC-98000 Monaco
Pollution effects on zooplankton; radioecology

Gray, J., Prof.
Institutt for Marinbiologi og Limnologi, Univ. Oslo, Postboks 1064, Blindern, Oslo 3, Norway
Pollution effects on benthos animals

Luoma, S. N., Dr
US Dept of the Interior, Geological Survey, Water Resources Div., 345 Middlefield Rd, Menlo Park, CA 94025, USA
Bioaccumulation of trace contaminants (principally trace elements and radionuclide waste products)

Marinescu, A.-G., Dr
Institute of Biological Sciences, 77748 Bucharest, Str. Splaiul-Independentei 296, Romania
Toxicology and stress responses in invertebrates

Mauchline, J., Dr
Scottish Marine Biological Ass., Dunstaffnage Marine Res. Lab., PO Box 3, Oban, Argyll PA34 4AD, Scotland
Radioactive pollution

McLusky, D. S., Dr
Dept of Biological Sciences, Univ. Stirling, Stirling FK9 4LA, Scotland
Biological effects of pollutants (petro-, chemical, organic enrichment)

Peterson, C. H., Prof.
Institute of Marine Science, Univ. of N. Carolina at Chapel Hill, 3407 Arendell Street, Morehead City, NC 28557, USA
Fisheries management and ecology

Polikarpov, G. G., Prof.
Institute of Biology of South Seas, Academy of Sciences Uk. SSR, 2, Nahimov St., Sevastopol 335000, Ukraine
Chemical ecology, radioecology, radiotracers, pollution; protection of sea life

Sherman, K., Dr
US Dept of Commerce, NOAA, Northeast Fisheries Center, 28 Tarzwell Dr., Narragansett, RI 02882, USA
Fisheries ecology; fishery resources; zooplankton

Westernhagen, H. von, Dr
Biologische Anstalt Helgoland, Notkestr. 31, W-2000 Hamburg 52, Germany
Fish egg and larval survival

CONTENTS

Volume 82 · Number 1 · 1992

RESEARCH ARTICLES

Franks, P. J. S.
Sink or swim: accumulation of biomass at fronts 1–12

Hjörleifsson, E., Klein-MacPhee, G.
Estimation of live standard length of winter flounder *Pleuronectes americanus* larvae from formalin-preserved, ethanol-preserved and frozen specimens 13–19

Carrassón, M., Stefanescu, C., Cartes, J. E.
Diets and bathymetric distributions of two bathyal sharks of the Catalan deep sea (western Mediterranean) 21–30

Bigelow, K. A.
Age and growth in paralarvae of the mesopelagic squid *Abralia trigonura* based on daily growth increments in statoliths 31–40

Bautista, B., Harris, R. P.
Copepod gut contents, ingestion rates and grazing impact on phytoplankton in relation to size structure of zooplankton and phytoplankton during a spring bloom 41–50

Fisher, T. R., Peele, E. R., Ammerman, J. W., Harding, L. W. Jr
Nutrient limitation of phytoplankton in Chesapeake Bay 51–63

Glibert, P. M., Miller, C. A., Garside, C., Roman, M. R., McManus, G. B.
NH_4^+ regeneration and grazing: interdependent processes in size-fractionated $^{15}NH_4^+$ experiments 65–74

Laima, M. J. C.
Extraction and seasonal variation of NH_4^+ pools in different types of coastal marine sediments 75–84

Jaramillo, E., Bertrán, C., Bravo, A.
Mussel biodeposition in an estuary in southern Chile 85–94

NOTE

Hovenkamp, F.
Growth-dependent mortality of larval plaice *Pleuronectes platessa* in the North Sea 95–101

Volume 82 · Number 2 · 1992

RESEARCH ARTICLES

Kvitek, R. G., Oliver, J. S.
Influence of sea otters on soft-bottom prey communities in southeast Alaska 103–113

Bulman, C. M., Koslow, J. A.
Diet and food consumption of a deep-sea fish, orange roughy *Hoplostethus atlanticus* (Pisces: Trachichthyidae), off southeastern Australia 115–129

Fowler, A. J., Doherty, P. J., Williams, D. McB.
Multi-scale analysis of recruitment of a coral reef fish on the Great Barrier Reef 131–141

Metcalf, K. S., Lipcius, R. N.
Relationship of habitat and spatial scale with physiological state and settlement of blue crab postlarvae in Chesapeake Bay 143–150

Webb, D. G., Parsons, T. R.
Winter-spring recruitment pattern of epiphytic harpacticoid copepods in a temperate-zone seagrass bed 151–162

Watkins, J. L., Buchholz, F., Priddle, J., Morris, D. J., Ricketts, C.
Variation in reproductive status of Antarctic krill swarms; evidence for a size-related sorting mechanism? 163–174

Stenton-Dozey, J. M. E., Brown, A. C.
Clearance and retention efficiency of natural suspended particles by the rock-pool bivalve *Venerupis corrugatus* in relation to tidal availability 175–186

Huettel, M., Gust, G.
Solute release mechanisms from confined sediment cores in stirred benthic chambers and flume flows 187–197

Hanelt, D.
Photoinhibition of photosynthesis in marine macrophytes of the South China Sea 199–206

Volume 82 · Number 3 · 1992

RESEARCH ARTICLES

Cole, R. G., Creese, R. G., Grace, R. V., Irving, P., Jackson, B. R.
Abundance patterns of subtidal benthic invertebrates and fishes at the Kermadec Islands 207–218

Brey, T., Hain, S.
Growth, reproduction and production of *Lissarca notorcadensis* (Bivalvia: Philobryidae) in the Weddell Sea, Antarctica 219–226

Southward, A. J., Southward, E. C.
Distribution of Pogonophora (tube-worms) in British Columbian fjords 227–233

Turon, X., Becerro, M. A.
Growth and survival of several ascidian species from the northwestern Mediterranean 235–247

Meyer, K. D., Paul, V. J.
Intraplant variation in secondary metabolite concentration in three species of *Caulerpa* (Chlorophyta: Caulerpales) and its effects on herbivorous fishes 249–257

DeWreede, R. E., Ewanchuk, P., Shaughnessy, F.
Wounding, healing and survivorship in three kelp species 259–266

Romeo, M., Gnassia-Barelli, M., Carré, C.
Importance of gelatinous plankton organisms in storage and transfer of trace metals in the northwestern Mediterranean 267–274

Nakamura, Y., Yamazaki, Y., Hiromi, J.
Growth and grazing of a heterotrophic dinoflagellate, *Gyrodinium dominans*, feeding on a red tide flagellate, *Chattonella antiqua* 275–279

Marrasé, C., Lim, E. L., Caron, D. A.
Seasonal and daily changes in bacterivory in a coastal plankton community 281–289

Fogel, M. L., Cifuentes, L. A., Velinsky, D. J., Sharp, J. H.
Relationship of carbon availability in estuarine phytoplankton to isotopic composition 291–300

Kirchman, D. L.
Incorporation of thymidine and leucine in the subarctic Pacific: application to estimating bacterial production 301–309

MARINE ECOLOGY PROGRESS SERIES

HISTORY: Marine Ecology Progress Series (MEPS) was established in response to requests from numerous marine ecologists from all over the world. The series is based on 'Marine Ecology' – the first comprehensive, integrated treatise on life in oceans and coastal waters – conceived, organized and edited by Professor Otto Kinne, and published by John Wiley & Sons.

AIM: MEPS serves as a world-wide forum for all aspects of marine ecology, fundamental and applied. The journal covers: microbiology, botany, zoology, ecosystem research, biological oceanography, ecological aspects of fisheries and aquaculture, pollution, environmental protection, conservation, resource management.

Ecological research has become of paramount importance for man's future. The information presented here should, therefore, encourage critical application of ecological knowledge for the benefit of mankind and, in fact, of life on earth. Marine Ecology Progress Series has received recognition as a leader in its field. The journal strives for

- complete coverage of the field of marine ecology
- the highest possible quality of scientific contributions
- quick publication
- a high technical standard of presentation.

SCOPE: MEPS is international and interdisciplinary. It presents rigorously refereed and carefully selected research articles, reviews and notes concerned with:

Environmental Factors: Tolerances and responses of marine organisms (microorganisms, autotrophic plants, and animals) to variations in abiotic and biotic components of their environment; radioecology.

Physiological Mechanisms: Synthesis and transversion of organic material (mechanisms of auto- and heterotrophy); thermo-, ion-, osmo- and volume-regulation; stress resistance; non-genetic and genetic adaptation; population genetics; orientation in space and time; migrations; behavior; molecular basis of ecological processes.

Cultivation: Maintenance and rearing of, as well as experimentation with, marine organisms under environmental and nutritional conditions which are, to a considerable degree, controlled; analysis of the physiological and ecological potential of individuals, populations and species; determination of nutritional requirements; ecological aspects of aquaculture; water-quality management; culture technology.

Dynamics: Production, transformation, and decomposition of organic matter in marine ecosystems; food webs; trophic interrelations; population dynamics; plankton ecology; benthos ecology; estuarine and coastal ecology; wadden-sea ecology; coral-reef ecology; deep-sea ecology; open-ocean ecology; polar ecology; theoretical ecology; ecological modelling.

Ocean Management: Applied marine field ecology; inventory, protection and management of living resources in coastal areas, estuaries and open oceans; ecological aspects of fisheries; pollution of marine areas and organisms; protection of life in the seas; management of populations, species and ecosystems; management of coastal zones and sea areas; biotechnology.

Publisher: Inter-Research, PO Box 1120, W-2124 Amelinghausen, Germany
Tel (+49) (0)4132 7127, Fax (+49) (0)4132 8883

Copyright © Inter-Research, Amelinghausen, 1992. All rights reserved. Mar. Ecol. Prog. Ser. 1992. Printed in Germany by Westholsteinische Verlagsdruckerei Boyens & Co., W-2240 Heide.

With the acceptance of a manuscript, the copyright is transferred to the publishers. Reproduction of any part of this publication by any means, as well as translation, requires their written permission. Trade marks or names appearing in this series may be subject to protective regulations or laws. The Article Fee Code (at the bottom of the first page of each paper) indicates the copyright holder's consent that, in the USA, copies of the paper may be made for personal or internal use. This consent is granted on condition that the copier pay the stated fee through the Copyright Clearance Center, Inc., PO Box 8891, Boston, Mass. 02114, for copying beyond that permitted by Section 107 or 108 of the US Copyright Law.

Publisher and editors provide no warranty, express or implied, with respect to the information presented in MEPS; they cannot accept any legal responsibility for possible errors or omissions.